NEWSPAPER 84

PHYSICAL REVIEW LETTERS

Contents

VOLUME 84, NUMBER 6 7 February 2000

PRL 84 (6), 1061–1361 (7 February 2000)

General Physics

Anomalous Spreading of Power-Law Quantum Wave Packets 1061
Fabrizio Lillo and Rosario N. Mantegna
Exact Eigenstates and Magnetic Response of Spin-1 and Spin-2 Bose-Einstein Condensates 1066
Masato Koashi and Masahito Ueda
Dynamics of Kinks: Nucleation, Diffusion, and Annihilation 1070
Salman Habib and Grant Lythe

Gravitation and Astrophysics

Gott Time Machines, BTZ Black Hole Formation, and Choptuik Scaling 1074
Danny Birmingham and Siddhartha Sen
Precision Measurement of Cosmic-Ray Antiproton Spectrum 1078
S. Orito, T. Maeno, H. Matsunaga, K. Abe, K. Anraku, Y. Asaoka, M. Fujikawa, M. Imori, M. Ishino, Y. Makida, N. Matsui, H. Matsumoto, J. Mitchell, T. Mitsui, A. Moiseev, M. Motoki, J. Nishimura, M. Nozaki, J. Ormes, T. Saeki, T. Sanuki, M. Sasaki, E. S. Seo, Y. Shikaze, T. Sonoda, R. Streitmatter, J. Suzuki, K. Tanaka, I. Ueda, N. Yajima, T. Yamagami, A. Yamamoto, T. Yoshida, and K. Yoshimura
Limits on Neutrino Mass from Cosmic Structure Formation 1082
Masataka Fukugita, Guo-Chin Liu, and Naoshi Sugiyama
Shell Structure of Nuclei in Strong Magnetic Fields in Neutron Star Crusts 1086
V. N. Kondratyev, T. Maruyama, and S. Chiba

Elementary Particles and Fields

Nonlinear Supergravity on a Brane without Compactification 1090
A. Chamblin and G. W. Gibbons
Tiling the Plane without Supersymmetry 1094
D. Bazeia and F. A. Brito
CPT and Lorentz Tests with Muons 1098
Robert Bluhm, V. Alan Kostelecký, and Charles D. Lane
Meson Structure in a Relativistic Many-Body Approach 1102
Felipe J. Llanes-Estrada and Stephen R. Cotanch
Parity Violation in Elastic Electron-Proton Scattering and the Proton's Strange Magnetic Form Factor 1106
D. T. Spayde, T. Averett, D. Barkhuff, D. H. Beck, E. J. Beise, C. Benson, H. Breuer, R. Carr, S. Covrig, J. DelCorso, G. Dodson, K. Dow, C. Eppstein, M. Farkhondeh, B. W. Filippone, P. Frazier, R. Hasty, T. M. Ito, C. E. Jones, W. Korsch, S. Kowalski, P. Lee, E. Maneva, K. McCarty, R. D. McKeown, J. Mikell, B. Mueller, P. Naik, M. Pitt, J. Ritter, V. Savu, M. Sullivan, R. Tieulent, E. Tsentalovich, S. P. Wells, B. Yang, and T. Zwart (SAMPLE Collaboration)
Search for Color Singlet Technicolor Particles in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV 1110
T. Affolder *et al.* (CDF Collaboration)

(Continued on Third Cover)

6

Copyright 2000 by The American Physical Society

Contents (Continued)

Nuclear Physics

Discovery of Doubly Magic ^{48}Ni 1116
B. Blank, M. Chartier, S. Czajkowski, J. Giovinazzo, M. S. Pravikoff, J.-C. Thomas, G. de France, F. de Oliveira Santos, M. Lewitowicz, C. Borcea, R. Grzywacz, Z. Janas, and M. Pfützner

Isospin Tracing: A Probe of Nonequilibrium in Central Heavy-Ion Collisions 1120
F. Rami *et al*. (FOPI Collaboration)

Atomic, Molecular, and Optical Physics

Guiding Neutral Atoms on a Chip 1124
N. H. Dekker, C. S. Lee, V. Lorent, J. H. Thywissen, S. P. Smith, M. Drndić, R. M. Westervelt, and M. Prentiss

Stability of the Ground State Vinylidene Anion H_2CC^- 1128
M. J. Jensen, U. V. Pedersen, and L. H. Andersen

Ultrafast Hot-Electron Dynamics Observed in Pt_3^- Using Time-Resolved Photoelectron Spectroscopy 1132
N. Pontius, P. S. Bechthold, M. Neeb, and W. Eberhardt

Measurement of the 1*s*-2*s* Energy Interval in Muonium 1136
V. Meyer, S. N. Bagayev, P. E. G. Baird, P. Bakule, M. G. Boshier, A. Breitrück, S. L. Cornish, S. Dychkov, G. H. Eaton, A. Grossmann, D. Hübl, V. W. Hughes, K. Jungmann, I. C. Lane, Yi-Wei Liu, D. Lucas, Y. Matyugin, J. Merkel, G. zu Putlitz, I. Reinhard, P. G. H. Sandars, R. Santra, P. V. Schmidt, C. A. Scott, W. T. Toner, M. Towrie, K. Träger, L. Willmann, and V. Yakhontov

Double Tunneling: An Overlooked Quantum Effect in Anionic Molecular Clusters 1140
Pavel Jungwirth and Vladimír Špirko

Variational Study of ^{3}He Droplets 1144
R. Guardiola and J. Navarro

Nonclassical Photon Statistics in Single-Molecule Fluorescence at Room Temperature 1148
L. Fleury, J.-M. Segura, G. Zumofen, B. Hecht, and U. P. Wild

Solid State Coherent Transient Measurements Using Hard Optical Pulses 1152
G. J. Pryde, M. J. Sellars, and N. B. Manson

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.

Information-Theoretic Limits of Control 1156
Hugo Touchette and Seth Lloyd

Beyond Nearest-Neighbor Spacing Distributions: A New Indicator for Core-Induced Chaos 1160
H. Held and W. Schweizer

Composite Multihump Vector Solitons Carrying Topological Charge 1164
Ziad H. Musslimani, Mordechai Segev, Demetrios N. Christodoulides, and Marin Soljačić

Behavior of the Cholesteric Liquid-Crystal Fabry-Perot Cavity in the Bragg Reflection Band 1168
Zhizhong Zhuang, Young Jin Kim, and J. S. Patel

Velocity Dependence of Atomic Friction 1172
E. Gnecco, R. Bennewitz, T. Gyalog, Ch. Loppacher, M. Bammerlin, E. Meyer, and H.-J. Güntherodt

Manifestation of Random Phase in a Finite Ensemble of a Turbulent Fluid 1176
Ari M. Turner and Leaf Turner

The D'yakov-Kontorovich Instability of Shock Waves in Real Gases 1180
Jason W. Bates and David C. Montgomery

Plasma and Beam Physics

Observation of a Hybrid Spin Resonance 1184
M. Bai, C. Allgower, L. Ahrens, J. Alessi, K. Brown, G. Bunce, P. Cameron, C. M. Chu, E. D. Courant, J. W. Glenn, H. Huang, D. Jeon, A. E. Kponou, K. Krueger, A. Luccio, Y. I. Makdisi, S. Y. Lee, L. Ratner, K. Reece, T. Roser, H. Spinka, M. J. Syphers, N. Tsoupas, D. G. Underwood, W. van Asselt, N. Williams, and A. Yokosawa

Free-Electron Laser as a Driver for a Resonant Cavity at 35 GHz 1188
T. Lefevre, J. Gardelle, J. L. Rullier, C. Vermare, J. T. Donohue, Y. Meurdesoif, and S. M. Lidia

Observation of Avalanchelike Phenomena in a Magnetically Confined Plasma 1192
P. A. Politzer

(Continued on Preceding Page)

Contents (Continued)

Helicity Redistribution during Relaxation of Astrophysical Plasmas 1196
T. Amari and J. F. Luciani
Ion Larmour Radius Effect on rf Ponderomotive Forces and Induced Poloidal Flow in Tokamak Plasmas 1200
A. G. Elfimov, G. Amarante Segundo, R. M. O. Galvão, and I. C. Nascimento
Sawtooth Evolution during JET Ion-Cyclotron-Resonance-Heated Pulses 1204
J. P. Graves, K. I. Hopcraft, R. O. Dendy, R. J. Hastie, K. G. McClements, and M. Mantsinen
Detuned Raman Amplification of Short Laser Pulses in Plasma 1208
V. M. Malkin, G. Shvets, and N. J. Fisch
Nature of Monster Sawteeth and Their Relationship to Alfvén Instabilities in Tokamaks 1212
S. Bernabei, M. G. Bell, R. V. Budny, E. D. Fredrickson, N. N. Gorelenkov, J. C. Hosea, R. Majeski, E. Mazzucato, C. K. Phillips, G. Schilling, and J. R. Wilson
Energy Confinement Time and Heat Transport in Initial Neutral Beam Heated Plasmas on the Large Helical Device ... 1216
H. Yamada, K. Y. Watanabe, S. Sakakibara, S. Murakami, M. Osakabe, O. Kaneko, K. Narihara, K. Tanaka, K. Ida, T. Minami, M. Goto, H. Idei, S. Inagaki, S. Kado, K. Kawahata, A. Komori, S. Kubo, J. Miyazawa, T. Morisaki, S. Morita, H. Nakanishi, S. Ohdachi, N. Ohyabu, Y. Oka, B. J. Peterson, R. Sakamoto, M. Shoji, H. Suzuki, Y. Takeiri, K. Toi, T. Tokuzawa, K. Tsumori, I. Yamada, K. Ohkubo, S. Sudo, K. Yamazaki, O. Motojima, M. Fujiwara, and LHD Experimental Group

Condensed Matter: Structure, etc.

Density-Functional Theory of Inhomogeneous Fluids in the Canonical Ensemble 1220
J. A. White, A. González, F. L. Román, and S. Velasco
Librons Observed in Liquid Acetonitrile by Hyper-Rayleigh Scattering 1224
David P. Shelton and Philip Kaatz
Pseudo-Casimir Structural Force Drives Spinodal Dewetting in Nematic Liquid Crystals 1228
P. Ziherl, R. Podgornik, and S. Žumer
Microscopic Origin of the Phenomenological Equilibrium "Doping Limit Rule" in n-Type III-V Semiconductors 1232
S. B. Zhang, S.-H. Wei, and Alex Zunger
Dynamics of Si-H Vibrations in an Amorphous Environment 1236
Marjolein van der Voort, Chris W. Rella, Lex F. G. van der Meer, Andrey V. Akimov, and Jaap I. Dijkhuis
Freezing by Heating in a Driven Mesoscopic System 1240
Dirk Helbing, Illés J. Farkas, and Tamás Vicsek
Topology, Phase Instabilities, and Wetting of Microemulsion Networks 1244
T. Tlusty, S. A. Safran, and R. Strey
Slow ^{4}He Quenches Produce Fuzzy, Transient Vortices 1248
R. J. Rivers
Repetitive Single Vortex-Loop Creation by a Vibrating Wire in Superfluid ^{3}He-B 1252
D. I. Bradley
Ab Initio Modeling of Metal Adhesion on Oxide Surfaces with Defects 1256
Yu. F. Zhukovskii, E. A. Kotomin, P. W. M. Jacobs, and A. M. Stoneham
Multiscale Simulation of Loading and Electrical Resistance in Silicon Nanoindentation 1260
G. S. Smith, E. B. Tadmor, and Efthimios Kaxiras

Condensed Matter: Electronic Properties, etc.

Ferromagnetism in Doped Excitonic Insulators 1264
Leon Balents and Chandra M. Varma
Virial Coefficients of Non-Abelian Anyons 1268
Alexios P. Polychronakos
Dynamical Properties of the One-Dimensional Band Insulator $(NbSe_4)_3I$ 1272
V. Vescoli, F. Zwick, J. Voit, H. Berger, M. Zacchigna, L. Degiorgi, M. Grioni, and G. Grüner
Metal-Insulator Transitions: Influence of Lattice Structure, Jahn-Teller Effect, and Hund's Rule Coupling 1276
J. E. Han, E. Koch, and O. Gunnarsson
Semiclassical Theory of Conductance and Noise in Open Chaotic Cavities 1280
Ya. M. Blanter and E. V. Sukhorukov

(Continued on Preceding Page)

Contents (Continued)

Bistability in Scanning Tunneling Spectroscopy of Ga-Terminated Si(111) 1284
I. B. Altfeder and D. M. Chen

Finite-Temperature Density Instability at High Landau Level Occupancy 1288
Tudor D. Stanescu, Ivar Martin, and Philip Phillips

Relevance of Disorder for Dirac Fermions with Imaginary Vector Potentials 1292
André LeClair

Interlayer Quasiparticle Transport in the Vortex State of Josephson Coupled Superconductors 1296
I. Vekhter, L. N. Bulaevskii, A. E. Koshelev, and M. P. Maley

Observation of Cascaded Two-Photon-Induced Transitions between Fluxoid States of a SQUID 1300
Siyuan Han, R. Rouse, and J. E. Lukens

Vortex Entanglement in Disordered Superconductors 1304
K. V. Samokhin

Exact Dynamical Structure Factor of the Degenerate Haldane-Shastry Model 1308
Takashi Yamamoto, Yasuhiro Saiga, Mitsuhiro Arikawa, and Yoshio Kuramoto

Step-Edge Induced Anisotropic Domain-Wall Propagation 1312
P. Haibach, M. Huth, and H. Adrian

Dynamics of a Domain Wall in Soft-Magnetic Materials: Barkhausen Effect and Relation with Sandpile Models 1316
Alexei Vázquez and Oscar Sotolongo-Costa

Nuclear Spin Relaxation Rates in Two-Leg Spin Ladders 1320
F. Naef and Xiaoqun Wang

Periodic Resonance Excitation and Intertube Interaction from Quasicontinuous Distributed Helicities in Single-Wall Carbon Nanotubes 1324
M. Milnera, J. Kürti, M. Hulman, and H. Kuzmany

Microimplosions: Cavitation Collapse and Shock Wave Emission on a Nanosecond Time Scale 1328
R. Pecha and B. Gompf

Atom Abstraction in the Scattering of State-Selected $NO^+(X^1\Sigma^+)$ on O/Al(111) 1331
M. Maazouz, T. L. O. Barstis, P. L. Maazouz, and D. C. Jacobs

Interdisciplinary Physics: Biological Physics, Quantum Information, etc.

Coupling between Flow and Structure for a Lamellar Surfactant Phase 1335
Aurélien Léon, Daniel Bonn, Jacques Meunier, Amer Al-Kahwaji, Olivier Greffier, and Hamid Kellay

Evidence for Non-DLVO Hydration Interactions in Solutions of the Protein Apoferritin 1339
Dimiter N. Petsev and Peter G. Vekilov

A Space-Time Adaptive Method for Simulating Complex Cardiac Dynamics 1343
Elizabeth M. Cherry, Henry S. Greenside, and Craig S. Henriquez

Random Costs in Combinatorial Optimization 1347
Stephan Mertens

From Massively Parallel Algorithms and Fluctuating Time Horizons to Nonequilibrium Surface Growth 1351
G. Korniss, Z. Toroczkai, M. A. Novotny, and P. A. Rikvold

Typical Performance of Gallager-Type Error-Correcting Codes 1355
Yoshiyuki Kabashima, Tatsuto Murayama, and David Saad

Errata

Erratum: Pairing Effects at the Edge of Paired Quantum Hall States [Phys. Rev. Lett. **81**, 1078 (1998)] 1359
Kazusumi Ino

Erratum: Angular Distribution Studies for the Time-Reversed Photoionization Process in Hydrogenlike Uranium: The Identification of Spin-Flip Transitions [Phys. Rev. Lett. **82**, 3232 (1999)] 1360
Th. Stöhlker, T. Ludziejewski, F. Bosch, R. W. Dunford, C. Kozhuharov, P. H. Mokler, H. F. Beyer, O. Brinzanescu, B. Franzke, J. Eichler, A. Griegal, S. Hagmann, A. Ichihara, A. Krämer, J. Lekki, D. Liesen, F. Nolden, H. Reich, P. Rymuza, Z. Stachura, M. Steck, P. Swiat, and A. Warczak

Erratum: Noiseless Optical Amplification of Images [Phys. Rev. Lett. **83**, 1938 (1999)] 1361
Sang-Kyung Choi, Michael Vasilyev, and Prem Kumar

Cumulative Author Index i